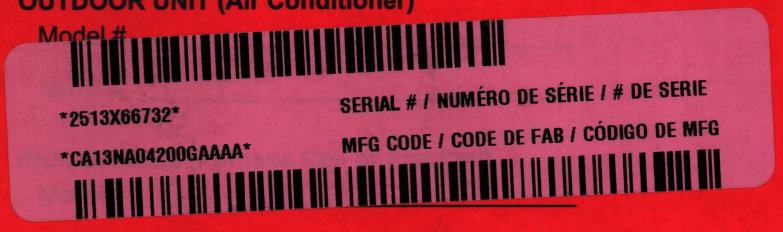
CA13, CA16

NOTE TO EQUIPMENT OWNER:

For your convenience, please record the model and serial numbers of your new equipment in the spaces provided. This information, along with the installation data and dealer contact information will be helpful should your system require maintenance or service.

OUTDOOR UNIT (Air Conditioner)

Model #



Serial # _____

ACCESSORIES (List type and model #)

_____

_____

_____

INSTALLATION INFORMATION:

Date Installed _____

DEALERSHIP CONTACT INFORMATION:

Company Name _____

Address _____

_____

Phone Number _____

Technician Name _____

_____

_____

THIS BOOKLET CONTAINS IMPORTANT INFORMATION

INSTALLER: USE THE INFORMATION IN THIS BOOKLET TO INSTALL THE APPLIANCE AND AFFIX THIS BOOKLET ADJACENT TO THE APPLIANCE AFTER INSTALLATION.

USER: KEEP THIS BOOKLET OF INFORMATION FOR FUTURE REFERENCE.

SERVICER: USE THE INFORMATION IN THIS BOOKLET TO SERVICE THE APPLIANCE AND AFFIX THE BOOKLET ADJACENT TO THE APPLIANCE AFTER SERVICING.

LITERATURE ASSEMBLY BOOKLET NO.: 338720-701

Cover Page P/N 338720-201

CAC/BDP
7310 W. Morris Street
Indianapolis, IN 46231 U.S.A.

MODEL CA13, CA16

338720-701 REV. A

338720-701 REV. A

NOTE TO INSTALLER: this manual must be left with the equipment owner.

CA13NA 018-060
CA16NA 018-030
SPLIT-SYSTEM AIR CONDITIONER
WITH R-410A REFRIGERANT

Installation Instructions

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and current editions of the National Electrical Code (NEC) NFPA 70. In Canada, refer to current editions of the Canadian electrical code CSA 22.1.

Recognize safety information. This is the safety-alert symbol ⚠ When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

GENERAL

NOTE: In some cases noise in the living area has been traced to gas pulsations from improper installation of equipment.

1. Locate unit away from windows, patios, decks, etc. where unit operation sound may disturb customer.
2. Ensure that vapor and liquid tube diameters are appropriate for unit capacity.
3. Run refrigerant tubes as directly as possible by avoiding unnecessary turns and bends.
4. Leave some slack between structure and unit to absorb vibration.
5. When passing refrigerant tubes through the wall, seal opening with RTV or other pliable silicon-based caulk. (See Fig. 1.)
6. Avoid direct tubing contact with water pipes, duct work, floor joists, wall studs, floors, and walls.
7. Do not suspend refrigerant tubing from joists and studs with a rigid wire or strap which comes in direct contact with tubing.(See Fig. 1.)
8. Ensure that tubing insulation is pliable and completely surrounds vapor tube.
9. When necessary, use hanger straps which are 1 in. (25.4 mm) wide and conform to shape of tubing insulation. (See Fig. 1.)
10. Isolate hanger straps from insulation by using metal sleeves bent to conform to shape of insulation.

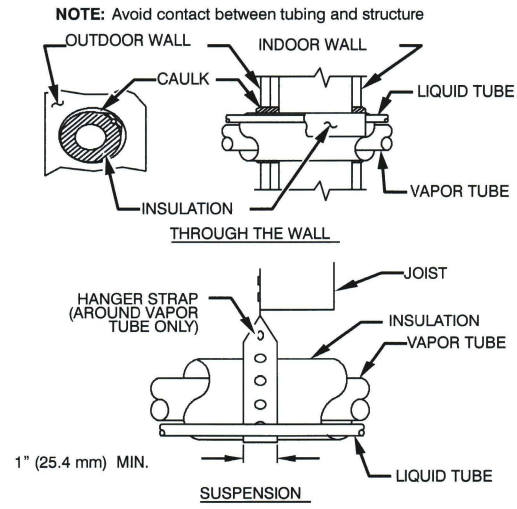


Fig. 1 - Piping Installation

The outdoor unit contains system refrigerant charge for operation with AHRI rated indoor unit when connected by 15 ft. (4.57 m) of field-supplied or factory accessory tubing. For proper unit operation, check refrigerant charge using charging information located on control box cover and/or in the Check Charge section of this instruction.

IMPORTANT: Maximum liquid-line size is 3/8-in. OD for all residential applications including long line. Refer to Residential Piping and Longline Guideline for further information.

IMPORTANT: Always install the factory-supplied liquid-line filter drier. If replacing the filter drier, refer to Product Data Digest for appropriate part number. Obtain replacement filter driers from your distributor or branch.

INSTALLATION

Check Equipment and Job Site

UNPACK UNIT

Move to final location. Remove carton taking care not to damage unit.

Inspect Equipment

File claim with shipping company prior to installation if shipment is damaged or incomplete. Locate unit rating plate on unit corner panel. It contains information needed to properly install unit. Check rating plate to be sure unit matches job specifications.

Install on a Solid, Level Mounting Pad

If conditions or local codes require the unit be attached to pad, tie down bolts should be used and fastened through knockouts provided in unit base pan. Refer to unit mounting pattern in Fig. 2 to determine base pan size and knockout hole location.

For hurricane tie downs, contact local distributor for details and PE (Professional Engineer) certification, if required by local authorities.

On rooftop applications, mount on level platform or frame. Place unit above a load-bearing wall and isolate unit and tubing set from structure. Arrange supporting members to adequately support unit and minimize transmission of vibration to building. Consult local codes governing rooftop applications.

Roof mounted units exposed to winds may require wind baffles. Consult the Application Guideline and Service Manual - Residential Split System Air Conditioners and Heat Pumps for wind baffle construction.

NOTE: Unit must be level to within ±2° (±3/8 in./ft ,.±9.5 mm/m) per compressor manufacturer specifications.

Clearance Requirements

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 24 in. (609.6 mm) clearance to service end of unit and 48 in. (1219.2 mm) (above unit. For proper airflow, a 6-in. (152.4 mm) clearance on 1 side of unit and 12-in. (304.8 mm) on all remaining sides must be maintained. Maintain a distance of 24 in. (609.6 mm) between units or 18 in. (457.2 mm) if no overhang within 12 ft. (3.66 m) Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

NOTE: 18" (457.2 mm) clearance option described above is approved for outdoor units with wire grille coil guard only. Units with louver panels require 24" (609.6 mm) between units.

On rooftop applications, locate unit at least 6 in. (152.4 mm) above roof surface.

Operating Ambient

The minimum outdoor operating ambient in cooling mode without accessory is 55 °F (12.78 °C), and the maximum outdoor operating ambient in cooling mode is 125°F (51.67 °C).

Make Piping Connections

⚠ WARNING

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

Failure to follow this warning could result in personal injury or death.

Relieve pressure and recover all refrigerant before system repair or final unit disposal. Use all service ports and open all flow-control devices, including solenoid valves.

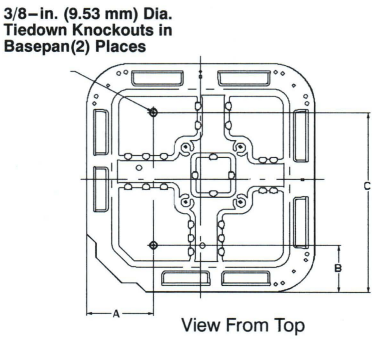
Federal regulations require that you do not vent refrigerant to the atmosphere. Recover during system repair or final unit disposal.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

If ANY refrigerant tubing is buried, provide a 6-in (152.4 mm). vertical rise at service valve. Refrigerant tubing lengths up to 36-in (914.4 mm). may be buried without further special consideration. Do not bury lines more than 36-in. (914.4 mm).



View From Top

UNIT BASE PAN Dimension in. (mm)	TIEDOWN KNOCKOUT LOCATIONS in. (mm)		
	A	B	C
23–1/2 X 23–1/2 (596.9 X 596.9)	7–13/16 (198.4)	4–7/16 (112.7)	18–1/16 (458.8)
26 X 26 (660.4 X 660.4)	9–1/8 (231.8)	4–7/16 (112.7)	21–1/4 (539.8)
31–1/2 X 31–1/2 (800.1 X 800.1)	9–1/8 (231.8)	6–9/16 (166.7)	24–11/16 (627.1)
35 X 35 (889 X 889)	9–1/8 (231.8)	6–9/16 (166.7)	28–7/16 (722.3)

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Fig. 2 - Tiedown Knockout Locations

Outdoor units may be connected to indoor section using accessory tubing package or field-supplied refrigerant grade tubing of correct size and condition. Rated tubing diameters shown in Table 1 are recommended up to 80 ft. (24.38 m). See Product Data for acceptable alternate vapor diameters and associated capacity losses. For tubing requirements beyond 80 ft. (24.38 m), substantial capacity and performance losses can occur. Following the recommendations in the Longline Guideline will reduce these losses. Refer to Table 1 for field tubing diameters. Refer to Table 5 for accessory requirements.

There are no buried-line applications greater than 36-in. (914.4 mm) allowed.

If refrigerant tubes or indoor coil are exposed to atmosphere, they must be evacuated to 500 microns to eliminate contamination and moisture in the system.

Outdoor Unit Connected to Factory Approved Indoor Unit

Outdoor unit contains correct system refrigerant charge for operation with factory approved AHRI rated indoor unit when connected by 15 ft. (4.57 m) of field-supplied or factory-accessory tubing, and factory supplied filter drier. Check refrigerant charge for maximum efficiency.

Refrigerant Tubing Connection Outdoor

Connect vapor and liquid tubes to fittings on vapor and liquid service valves (see Table 1.) Use refrigerant grade tubing

Sweat Connection

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Service valves must be wrapped in a heat-sinking material such as a wet cloth while brazing.

Use refrigeration grade tubing. Service valves are closed from factory and ready for brazing. After wrapping service valve with a wet cloth, braze sweat connections using industry accepted methods and materials. Consult local code requirements. Refrigerant tubing and indoor coil are now ready for leak testing. This check should include all field and factory joints.

Table 1 – Refrigerant Connections and Recommended Liquid and Vapor Tube Diameters (In.)

CA13NA			
UNIT SIZE	LIQUID	RATED VAPOR*	
	Connection & Max. Tube Diameter	Connection Diameter	Tube Diameter
18, 24	3/8	3/4	3/4
30	3/8	3/4	3/4
36	3/8	7/8	7/8
42, 48	3/8	7/8	7/8
60	3/8	7/8	1–1/8

CA16NA			
UNIT SIZE	LIQUID	RATED VAPOR*	
	Connection & Max. Tube Diameter	Connection Diameter	Tube Diameter
18, 24	3/8	3/4	3/4
30	3/8	3/4	3/4

* Units are rated with 25 ft. (7.6 m) of lineset. See Product Data sheet for performance data when using different size and length linesets.

Notes:

1. Do not apply capillary tube or fixed orifice indoor coils to these units.
2. For Tubing Set lengths between 80 and 200 ft. (24.38 and 60.96 m) horizontal or 35 ft. (10.7 m) vertical differential 250 ft. (76.2 m) Total Equivalent Length), refer to the Residential Piping and Longline Guide line– Air Conditioners and Heat Pumps using Puron refrigerant.
3. For alternate liquid line options on 18–42 size units, see Product Data or Residential Piping and Application Guideline

Install Liquid-Line Filter Drier Indoor

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

1. Installation of filter drier in liquid line is required.

2. Filter drier must be wrapped in a heat-sinking material such as a wet cloth while brazing.

Refer to Fig. 3 and install filter drier as follows:

1. Braze 5-in. liquid tube to the indoor coil.
2. Wrap filter drier with damp cloth.
3. Braze filter drier to above 5-in. (127 mm) liquid tube. Flow arrow must point towards indoor coil.
4. Connect and braze liquid refrigerant tube to the filter drier.

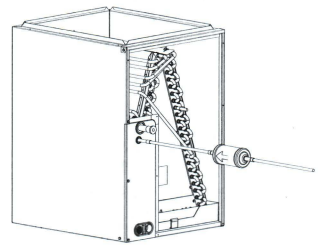

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Fig. 3 - Liquid Line Filter Drier

Evacuate Refrigerant Tubing and Indoor Coil

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Never use the system compressor as a vacuum pump.

Refrigerant tubes and indoor coil should be evacuated using the recommended deep vacuum method of 500 microns. The alternate triple evacuation method may be used (see triple evacuation procedure in service manual). Always break a vacuum with dry nitrogen.

Deep Vacuum Method

The deep vacuum method requires a vacuum pump capable of pulling a vacuum of 500 microns and a vacuum gage capable of accurately measuring this vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and liquid water. A tight dry system will hold a vacuum of 1000 microns after approximately 7 minutes. See Fig. 4.

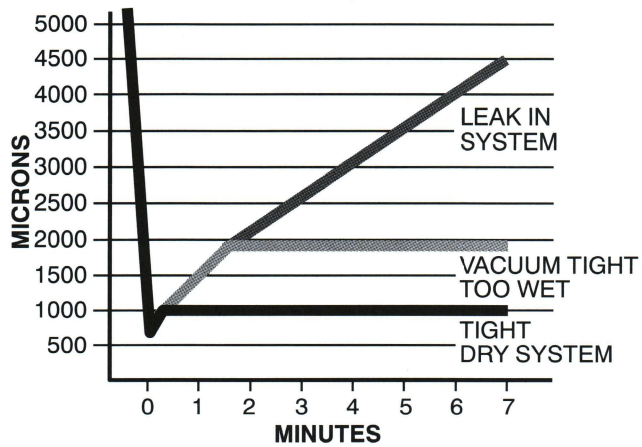

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Fig. 4 - Deep Vacuum Graph

Final Tubing Check

IMPORTANT: Check to be certain factory tubing on both indoor and outdoor unit has not shifted during shipment. Ensure tubes are not rubbing against each other or any sheet metal or wires. Pay close attention to feeder tubes, making sure wire ties on feeder tubes are secure and tight.

Installing with Indoor Piston

Outdoor Unit Connected to Factory Approved Indoor Unit

Check piston size shipped with indoor unit to see if it matches required indoor piston size. If it does not match, replace indoor piston with correct piston size.

NOTE: Correct pistons are shipped with outdoor units in the accessory bag and are only qualified for piston fan coils. Example fan coils with piston: FB4C and FY5B (1.5 through 4 ton)

When changing indoor piston, use a back−up wrench. Hand tighten hex nut, then tighten with wrench 1/2 turn. Do not exceed 30 ft−lbs. The indoor piston contains a Teflon ring (or seal) which is used to seat against the inside of distributor body, and must be installed properly to ensure proper seating. See Fig.

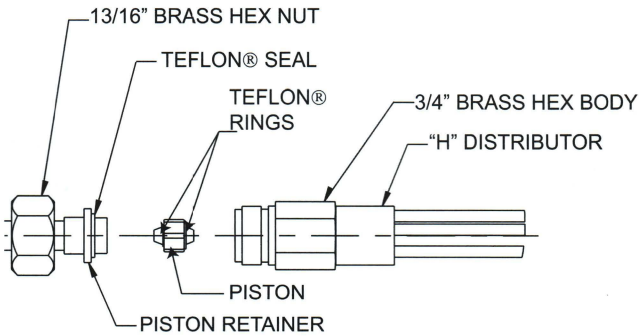

Fig. 5 - Indoor (Cooling) Piston

⚠ CAUTION

PRODUCT OPERATION HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

If using a TXV in conjunction with a single-phase reciprocating compressor, a compressor start capacitor and relay are required.

Units with Cooling Mode TXV

Units installed with cooling mode TXV require charging by the subcooling method.

1. Operate unit a minimum of 15 minutes before checking charge.
2. Measure liquid service valve pressure by attaching an accurate gage to service port.
3. Measure liquid line temperature by attaching an accurate thermistor type or electronic thermometer to liquid line near outdoor coil.
4. Refer to unit rating plate for required subcooling temperature.
5. Refer to Table 2 - *Rating Plate (required) Subcooling Temperature.* Find the point where required subcooling temperature intersects measured liquid service valve pressure.
6. To obtain required subcooling temperature at a specific liquid line pressure, add refrigerant if liquid line temperature is higher than indicated or reclaim refrigerant if temperature is lower. Allow a tolerance of ±3°F (±1.7°C).

Units with Indoor Piston

Units installed with indoor pistons require charging by the superheat method.

The following procedure is valid when indoor airflow is within ±21 percent of its rated CFM.

1. Operate unit a minimum of 15 minutes before checking charge.
2. Measure suction pressure by attaching an accurate gage to suction valve service port.
3. Measure suction temperature by attaching an accurate thermistor type or electronic thermometer to suction line at service valve.
4. Measure outdoor air dry□bulb temperature with thermometer.
5. Measure indoor air (entering indoor coil) wet-bulb temperature with a sling psychrometer.
6. Refer to Table 3 - *Superheat Charging - AC Only.* Find outdoor temperature and evaporator entering air wet-bulb temperature. At this intersection, note superheat. Where a dash (--) appears on the table, do not attempt to charge system under these conditions or refrigerant slugging may occur. Charge must be weighted in, adding or removing 0.6 oz/ft of 3/8 liquid line above or below 15 feet (4.6m) respectively.
7. Refer to Table 4 - *Required Suction-Line Temperature.* Find superheat temperature (from #6 above) and suction pressure. At this intersection, note suction line temperature.
8. If unit has a higher suction line temperature than charted temperature, add refrigerant until charted temperature is reached.
9. If unit has a lower suction line temperature than charted temperature, reclaim refrigerant until charted temperature is reached.
10. When adding refrigerant, charge in liquid form into suction service port using a flow-restricting device.
11. If outdoor air temperature or pressure at suction valve changes, charge to new suction line temperature indicated on chart.
12. Optimum performance will be achieved when the operating charge produces 10°F suction superheat at suction service valve with 95°F (35°C) outdoor ambient and 80°F (27°C) dry bulb (67°F / 19°C) wet bulb) indoor temperature (DOE "A" test conditions) at rated airflow.

Table 2 – Rating Plate (required) Subcooling Temperatures

Measure Liquid Pressure (psig)	R–410A Required Liquid Line Temperature °F (°C)											
	°F	(°C)	°F	(°C)	°F	(°C)	°F	(°C)	°F	(°C)	°F	(°C)
	6	3	8	4	10	6	12	7	14	8	16	9
251	78	26	76	24	74	23	72	22	70	21	68	20
259	80	27	78	26	76	24	74	23	72	22	70	21
266	82	28	80	27	78	26	76	24	74	23	72	22
274	84	29	82	28	80	27	78	26	76	24	74	23
283	86	30	84	29	82	28	80	27	78	26	76	24
291	88	31	86	30	84	29	82	28	80	27	78	26
299	90	32	88	31	86	30	84	29	82	28	80	27
308	92	33	90	32	88	31	86	30	84	29	82	28
317	94	34	92	33	90	32	88	31	86	30	84	29
326	96	36	94	34	92	33	90	32	88	31	86	30
335	98	37	96	36	94	34	92	33	90	32	88	31
345	100	38	98	37	96	36	94	34	92	33	90	32
364	104	40	102	39	100	38	98	37	96	36	94	34
374	106	41	104	40	102	39	100	38	98	37	96	36
384	108	42	106	41	104	40	102	39	100	38	98	37
395	110	43	108	42	106	41	104	40	102	39	100	38
406	112	44	110	43	108	42	106	41	104	40	102	39
416	114	46	112	44	110	43	108	42	106	41	104	40
427	116	47	114	46	112	44	110	43	108	42	106	41
439	118	48	116	47	114	46	112	44	110	43	108	42
450	120	49	118	48	116	47	114	46	112	44	110	43
462	122	50	120	49	118	48	116	47	114	46	112	44
474	124	51	122	50	120	49	118	48	116	47	114	46

Table 3 – Superheat Charging - AC Only

OUTDOOR TEMP (°F)	EVAPORATOR ENTERING AIR TEMPERATURE (°F WB)													
	50	52	54	56	58	60	62	64	67	68	70	72	74	76
55	9	12	14	17	20	23	26	29	32	35	37	40	42	45
60	7	10	12	15	18	21	24	27	30	33	35	38	40	43
65	—	6	10	13	16	19	21	24	27	30	33	36	38	41
70	—	—	7	10	13	16	19	21	24	27	30	33	36	39
75	—	—	—	6	9	12	15	18	21	24	28	31	34	37
80	—	—	—	—	5	8	12	15	18	21	25	28	31	35
85	—	—	—	—	—	—	8	11	15	19	22	26	30	33
90	—	—	—	—	—	—	5	9	13	16	20	24	27	31
95	—	—	—	—	—	—	—	6	10	14	18	22	25	29
100	—	—	—	—	—	—	—	—	8	12	15	20	23	27
105	—	—	—	—	—	—	—	—	5	9	13	17	22	26
110	—	—	—	—	—	—	—	—	—	6	11	15	20	25
115	—	—	—	—	—	—	—	—	—	—	8	14	18	23

*Optimum performance point, 95°F (35°C) outdoor ambient and (80°F / 27°C dry bulb), (67°F / 19°C wet bulb) indoor conditions. (DOE A Test Conditions)
Where a dash (– –) appears do not attempt to charge system under these conditions or refrigerant slugging may occur. Charge must be weighed in.
Note: Superheat °F is at low–side service port, Allow a tolerance of ±3°F (±1.7°C)
Note: Indoor dry bulb between 70°F and 80°F (21°C and 27°C)

Table 4 – Required Suction-Line Temperature

SUPERHEAT TEMP (°F)	SUCTION PRESSURE AT SERVICE PORT (PSIG)								
	107.8	112.2	116.8	121.2	126	130.8	138.8	140.8	145.8
0	35	37	39	41	43	45	47	49	51
2	37	39	41	43	45	47	49	51	53
4	39	41	43	45	47	49	51	53	55
6	41	43	45	47	49	51	53	55	57
8	43	45	47	49	51	53	55	57	59
10	45	47	49	51	53	55	57	59	61
12	47	49	51	53	55	57	59	61	63
14	49	51	53	55	57	59	61	63	65
16	51	53	55	57	59	61	63	65	67
18	53	55	57	59	61	63	65	67	69
20	55	57	59	61	63	65	67	69	71
22	57	59	61	63	65	67	69	71	73
24	59	61	63	65	67	69	71	73	75
26	61	63	65	67	69	71	73	75	77
28	63	65	67	69	71	73	75	77	79
30	65	67	69	71	73	75	77	79	81
32	67	69	71	73	75	77	79	81	83
34	69	71	73	75	77	79	81	83	85
36	71	73	75	77	79	81	83	85	87
38	73	75	77	79	81	83	85	87	89
40	75	77	79	81	83	85	87	89	91

Make Electrical Connections

Be sure field wiring complies with local and national fire, safety, and electrical codes, and voltage to system is within limits shown on unit rating plate. Contact local power company for correction of improper voltage. See unit rating plate for recommended circuit protection device.

NOTE: Operation of unit on improper line voltage constitutes abuse and could affect unit reliability. See unit rating plate. Do not install unit in system where voltage may fluctuate above or below permissible limits.

NOTE: Use copper wire only between disconnect switch and unit.

NOTE: Install branch circuit disconnect of adequate size per NEC to handle unit starting current. Locate disconnect within sight from and readily accessible from unit, per Section 440-14 of NEC.

Route Ground and Power Wires

Remove access panel to gain access to unit wiring. Extend wires from disconnect through power wiring hole provided and into unit control box.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

The unit cabinet must have an uninterrupted or unbroken ground to minimize personal injury if an electrical fault should occur. The ground may consist of electrical wire or metal conduit when installed in accordance with existing electrical codes.

Connect Ground and Power Wires

Connect ground wire to ground connection in control box for safety. Connect power wiring to contactor as shown in Fig. 5.

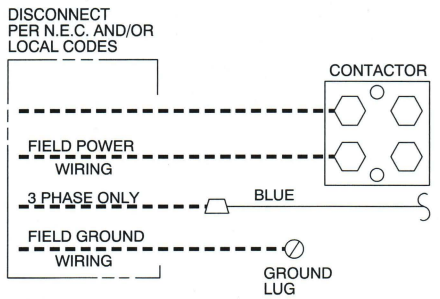

Fig. 6 - Line Connections

Connect Control Wiring

Route 24-v control wires through control wiring grommet and connect leads to control wiring (See Fig. 7). Refer to Installation Instructions packaged with thermostat.

Use No. 18 AWG color-coded, insulated (35°C minimum) wire. If thermostat is located more than 100 ft. (30.48 m) from unit, as measured along the control voltage wires, use No. 16 AWG color-coded wire to avoid excessive voltage drop.

All wiring must be NEC Class 1 and must be separated from incoming power leads.

Use furnace transformer, fan coil transformer, or accessory transformer for control power, 24v/40va minimum.

NOTE: Use of available 24v accessories may exceed the minimum 40va power requirement. Determine total transformer loading and increase the transformer capacity or split the load with an accessory transformer as required.

Final Wiring Check

IMPORTANT: Check factory wiring and field wire connections to ensure terminations are secured properly. Check wire routing to ensure wires are not in contact with tubing, sheet metal, etc.

Compressor Crankcase Heater

When equipped with a crankcase heater, furnish power to heater a minimum of 24 hr before starting unit. To furnish power to heater only, set thermostat to OFF and close electrical disconnect to outdoor unit.

A crankcase heater is required if refrigerant tubing is longer than 80 ft. (24.38 m). Refer to the Residential Piping and Longline Guideline and Service Manual Longline Section-Residential Split-System Air Conditioners and Heat Pumps.

Install Electrical Accessories

Refer to the individual instructions packaged with kits or accessories when installing.

Start-Up

⚠ CAUTION

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this caution may result in personal injury, equipment damage or improper operation.

- Do not overcharge system with refrigerant.
- Do not operate unit in a vacuum or at negative pressure.
- Compressor dome temperatures may be hot.

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

Wear safety glasses, protective clothing, and gloves when handling refrigerant and observe the following:

- Front seating service valves are equipped with Schrader valves.

Follow these steps to properly start up system:

1. After system is evacuated, fully open liquid and vapor service valves.
2. Unit is shipped with valve stem(s) front seated (closed) and caps installed. Replace stem caps after system is opened to refrigerant flow. Replace caps finger-tight and tighten with wrench an additional 1/12 turn.
3. Close electrical disconnects to energize system.
4. Set room thermostat at desired temperature. Be sure set point is below indoor ambient temperature.
5. Set room thermostat to COOL and fan control to ON or AUTO mode, as desired. Operate unit for 15 minutes. Check system refrigerant charge.

3-Phase Monitor

In 3-phase units a small circuit board is factory installed to monitor line voltage. A small led will flash if a phase problem exists. See code descriptions on monitor. If LED is flashing, disconnect power to unit and interchange 2 field-wiring leads on unit contactor.

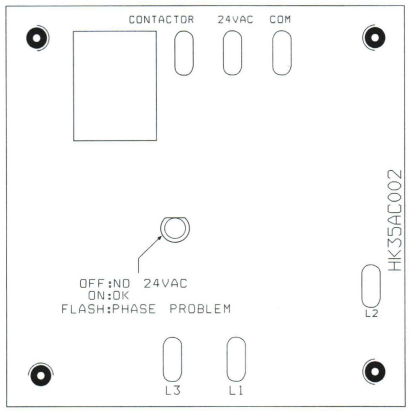

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Fig. 7 - 3-Phase Monitor Control (Applies to 3-Phase Units Only)

Table 5 – Three-Phase Monitor LED Indicators

LED	STATUS
OFF	No call for compressor operation
FLASHING	Reversed phase
ON	Normal

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Ensure compressor rotation is correct.

- 3-phase scroll compressors are rotation sensitive.
- A flash LED on phase monitor indicates reverse rotation. (See Table 3)

This will not allow contractor to be energized.

- Disconnect power to unit and interchange 2 field-wiring leads on unit contactor.

Sequence of Operation

Turn on power to indoor and outdoor units. Transformer is energized.

On a call for cooling, thermostat makes circuits R-Y and R-G. Circuit R-Y energizes contactor, starting outdoor fan motor and compressor circuit. R-G energizes indoor unit blower relay, starting indoor blower motor on high speed.

When thermostat is satisfied, its contacts open, de-energizing contactor and blower relay. Compressor and motors stop.

If indoor unit is equipped with a time-delay relay circuit, the indoor blower will run an additional 90 seconds to increase system efficiency.

Check Charge

Factory charge amount and desired subcooling are shown on unit rating plate. Charging method is shown on information plate inside unit. To properly check or adjust charge, conditions must be favorable for subcooling charging. Favorable conditions exist when the outdoor temperature is between 70°F and 100°F (21.11°C and 37.78°C), and the indoor temperature is between 70°F and 80°F (21.11°C and 26.67°C). Follow the procedure below:

Unit is factory charged for 15ft (4.57 m) of lineset. Adjust charge by adding or removing 0.6 oz/ft of 3/8 liquid line above or below 15ft (4.57 m) respectively.

For standard refrigerant line lengths (80 ft/24.38 m or less), allow system to operate in cooling mode at least 15 minutes. If conditions are favorable, check system charge by subcooling method. If any adjustment is necessary, adjust charge slowly and allow system to operate for 15 minutes to stabilize before declaring a properly charged system.

If the indoor temperature is above 80°F (26.67°C), and the outdoor temperature is in the favorable range, adjust system charge by weight based on line length and allow the indoor temperature to drop to 80°F (26.67°C) before attempting to check system charge by subcooling method as described above.

If the indoor temperature is below 70°F (21.11°C), or the outdoor temperature is not in the favorable range, adjust charge for line set length above or below 15ft (4.57 m) only. Charge level should then be appropriate for the system to achieve rated capacity. The charge level could then be checked at another time when the both indoor and outdoor temperatures are in a more favorable range.

NOTE: If line length is beyond 80 ft (24.38 m) or greater than 20 ft (6.10 m) vertical separation, See Long Line Guideline for special charging requirements.

Final Checks

IMPORTANT: Before leaving job, be sure to do the following:

1. Ensure that all wiring is routed away from tubing and sheet metal edges to prevent rub-through or wire pinching.
2. Ensure that all wiring and tubing is secure in unit before adding panels and covers. Securely fasten all panels and covers.
3. Tighten service valve stem caps to 1/12-turn past finger tight.
4. Leave Owner's Manual with owner. Explain system operation and periodic maintenance requirements outlined in manual.
5. Fill out Dealer Installation Checklist and place in customer file.

CARE AND MAINTENANCE

For continuing high performance and to minimize possible equipment failure, periodic maintenance must be performed on this equipment.

Frequency of maintenance may vary depending upon geographic areas, such as coastal applications. See Owner's Manual for information.

Table 6 – Accessory Usage

ACCESSORY	REQUIRED FOR LOW–AMBIENT COOLING APPLICATIONS (Below 55°F/12.8°C)	REQUIRED FOR LONG LINE APPLICATIONS*	REQUIRED FOR SEA COAST APPLICATIONS (Within 2 miles/3.22 km)
Ball Bearing Fan Motor	Yes†	No	No
Compressor Start Assist Capacitor and Relay	Yes	Yes	No
Crankcase Heater	Yes	Yes	No
Evaporator Freeze Thermostat	Yes	No	No
Hard Shut–Off TXV	Yes	Yes	Yes
Liquid Line Solenoid Valve	No	No	No
Motor Master® or Low–ambient Pressure Switch	Yes	No	No
Support Feet	Recommended	No	Recommended
Winter Start Control	Yes	No	No

* For tubing line sets between 80 and 200 ft. (24.38 and 60.96 m) and/or 35 ft. (10.7 m) vertical differential, refer to Residential Piping and Longline Guideline.
† Additional requirement for Low–Ambient Controller (full modulation feature) MotorMaster® Control.

Always Ask For

FACTORY AUTHORIZED PARTS

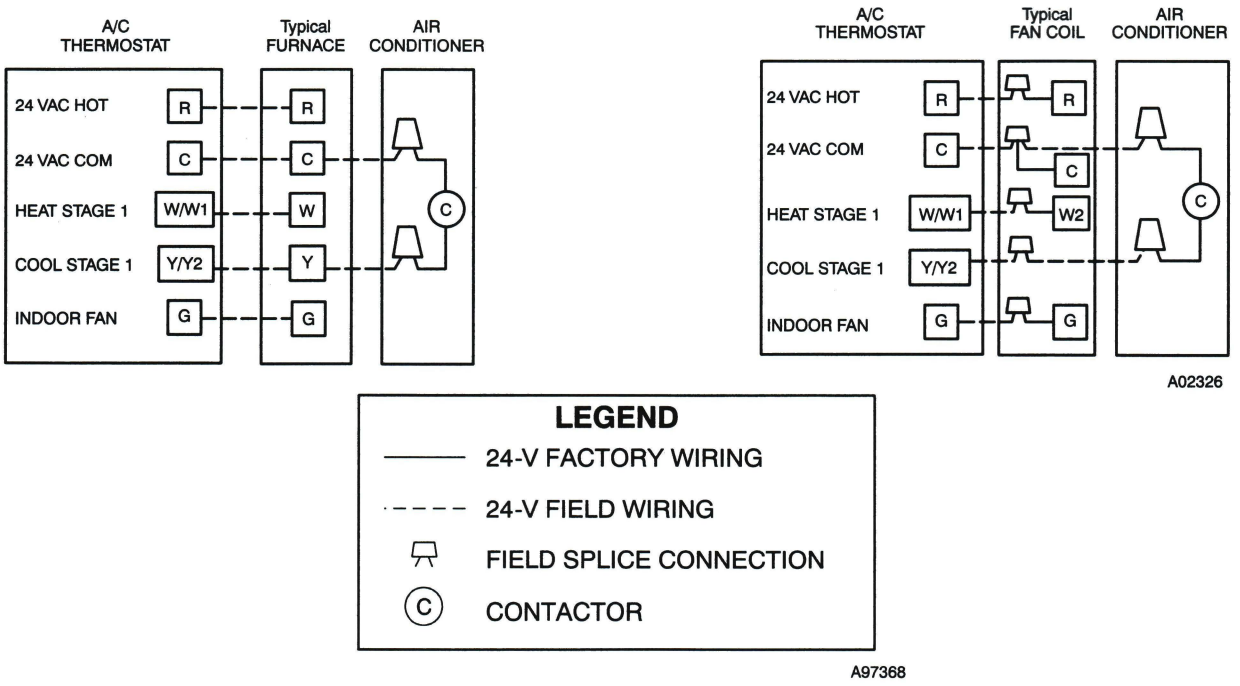

Fig. 8 - Generic Wiring Diagrams
(See Thermostat Installation Instruction for specific unit combinations)

PURON® (R-410A) REFRIGERANT QUICK REFERENCE GUIDE

- Puron refrigerant operates at 50-70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with Puron refrigerant
- Puron refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig, DOT 4BA400 or DOT BW400.
- Puron refrigerant systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose when charging into suction line with compressor operating
- Manifold sets should be 700 psig high side and 180 psig low side with 550 psig low-side retard.
- Use hoses with 700 psig service pressure rating.
- Leak detectors should be designed to detect HFC refrigerant.
- Puron refrigerant, as with other HFCs, is only compatible with POE oils.
- Vacuum pumps will not remove moisture from oil.
- Do not use liquid-line filter driers with rated working pressures less than 600 psig.
- Do not leave Puron suction line filter driers in line longer than 72 hours.
- Do not install a suction-line filter drier in liquid line.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- POE oils may cause damage to certain plastics and roofing materials.
- Wrap all filter driers and service valves with wet cloth when brazing.
- A factory approved liquid-line filter drier is required on every unit.
- Do NOT use an R-22 TXV.
- If indoor unit is equipped with an R-22 TXV or piston metering device, it must be changed to a hard shutoff Puron TXV.
- Never open system to atmosphere while it is under a vacuum.
- When system must be opened for service, recover refrigerant, evacuate then break vacuum with dry nitrogen and replace filter driers. Evacuate to 500 microns prior to recharging.
- Do not vent Puron refrigerant into the atmosphere.
- Do not use capillary tube coils.
- Observe all **warnings**, **cautions**, and **bold** text.
- All indoor coils must be installed with a hard shutoff Puron TXV metering device.

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Replaces: CA13NA–01SI

HOME OWNER'S INFORMATION

R-410A SPLIT SYSTEM AIR CONDITIONERS

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

Recognize safety information. This is the safety-alert symbol ⚠ When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

THERMOSTAT

Your air conditioner is controlled by the thermostat mounted on your wall. The thermostat is a highly sensitive low voltage device and is available in several different configurations from different manufacturers. The details listed below are typical for most installations. Ask your dealer for more specific information regarding the model of thermostat installed.

Cooling Mode

Set the system selector switch to COOL. The air conditioner will run until the actual room temperature is lowered to the point you have selected.

Temperature Control

Set the temperature selector to your desired room temperature. The air conditioner will run any time the actual room temperature rises above the point you have selected.

Fan Control

The fan selector switch allows you to run the fan continuously or cycle it automatically with the cooling system. Set the selector switch to ON for continuous operation or to AUTO for automatic cycling. For maximum comfort satisfaction, continuous fan operation throughout the year is recommended (selector switch set to ON).

WHAT TO DO IF YOUR SYSTEM DOES NOT WORK

Before Requesting a Service Call:

1. Check thermostat settings. Make sure to select a temperature below the actual room temperature. Make sure the system selector switch is in the COOL position.
2. Inspect your return air filter. Replace a dirty filter or clean a reusable type filter.
3. Check circuit breakers and/or fuses. Reset breakers or replace fuses as necessary.
4. Inspect the coils and fins on the outdoor unit. Clean away any obstructions (grass clippings, leaves, dirt, dust, or lint). Check that branches, twigs, or other debris are not obstructing the fan blade.

If your system still does not operate, contact your servicing dealer.

Have the Model and Serial Numbers of the indoor and outdoor units available and be sure to describe the problem.

REGULAR MAINTENANCE REQUIREMENTS

Your system should be regularly inspected by a qualified service technician. Between visits, there are some routine maintenance procedures you can do to help keep your system operating at peak performance.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Turn OFF all electrical power to both the indoor and outdoor units before performing any maintenance or removing any panels or doors. There may be more than one electrical disconnect switch

Air Filter

Inspect air filters at least monthly and replace or clean as required. Disposable type filters should be replaced. Reusable type filters may be cleaned by soaking in mild detergent and rinsing with cold water. Install filters with the arrows on the side pointing in the direction of air flow.

Dirty air filters are the most common cause of inadequate cooling performance, and of compressor failures.

Condensate Drain

The indoor coil condenses water from the air, and this water must be disposed through an appropriate drain system. During the cooling season check at least monthly for free flow of drainage and clean if necessary.

Outdoor Unit Coils

Grass clippings, leaves, dirt, dust, lint from clothes dryers, and fall-off from trees can be drawn into coils by movement of the air. Clogged outdoor coils will lower the efficiency of your unit and could cause damage to the compressor. Clean debris away from the outdoor coils.

Use a soft bristle brush with light pressure only. Do not damage or bend coil fins. Damaged or bent fins may affect unit operation.

Painted Surfaces

In geographical areas where the water has a high concentration of minerals (calcium, iron, sulfur, etc.) it is recommended that lawn sprinklers not be allowed to spray on the unit. Spraying this type of water on the unit may result in premature deterioration of the paint finish and metal components.

Never use a weather cover over the outdoor unit unless it is a ventilated type or made of breathable fabric that will allow moisture to evaporate rapidly. A cover that holds moisture in the unit will cause more rust build-up and damage than normal exposure to weather.

REGULAR DEALER MAINTENANCE

In addition to the routine maintenance that you perform, your home comfort system should be inspected regularly by a properly trained service technician. The inspection (preferably twice each year, but at least once every year) should include the following:

- Routine inspection of air filter(s). Replacement or cleaning as required.
- Inspection and cleaning of the blower wheel, housing, and motor as required.
- Inspection and, if required, cleaning of indoor and outdoor coils.
- Inspection of the indoor coil drain pan, plus the primary and secondary drain lines. If supplied, the auxiliary drain pan and line should be inspected at this time. Service should include cleaning if required.
- A check of all electrical wiring and connections.
- A check for secure physical connections of individual components within units.
- Operational check of the air conditioner system to determine actual working condition. Necessary repair and/or adjustment should be performed at this time.

Your servicing dealer may offer an economical service contract that covers seasonal inspections. Ask for further details.

FOR THE RECORD

Record the model, product, and serial numbers of your new equipment. This information, along with the other ready reference facts requested, will be necessary should you ever require information or service.

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Replaces: New

Limited Warranty for Air Conditioner & Heat Pump Condensing Units

FOR WARRANTY SERVICE OR REPAIR:

Contact the installer. You may be able to find the installer's name on the equipment or in your Owner's Packet.

For help, contact: CAC/BDP, Consumer Relations, P.O. Box 4808, Syracuse, New York 13221, Phone 1-800-227-7437

PRODUCT REGISTRATION: You can register your product online at *www.cac-bdp.com*.

Model Number_____ Serial Number _____

Date of Installation _____ Installed by _____

Name of Owner _____ Address of Installation _____

CAC/B DP (hereinafter "Company") warrants this product against failure due to defect in materials or workmanship under normal use and maintenance as follows. All warranty periods begin on the date of original installation. If a part fails due to defect during the applicable warranty period Company will provide a new or remanufactured part, at Company's option, to replace the failed defective part at no charge for the part. Alternatively, and at its option, the Company will provide a credit in the amount of the then factory selling price for a new equivalent part toward the retail purchase price of a new Company product. Except as otherwise stated herein, those are Company's exclusive obligations under this warranty for a product failure. This limited warranty is subject to all provisions, conditions, limitations and exclusions listed below and on the reverse (if any) of this document.

OWNER-OCCUPIED, RESIDENTIAL APPLICATIONS
This warranty is to the original purchasing owner and is transferable only to the extent and as stated in the Warranty Conditions and below. The warranty period in years, depending on the part and the claimant, is as shown in the chart below.

		Limited Warranty (Years)	
Product	Item	Original Owner	Subsequent Owner
Air Conditioner or Heat Pump Condensing Unit	Parts	10* (or 5)	5
	Compressor	10* (or 5)	5

* If properly registered within 90 days, otherwise 5 years (except in California and Quebec and other jurisdictions that prohibit warranty benefits conditioned on registration, registration is not required to obtain longer warranty periods). See Warranty Conditions below.

OTHER RESIDENTIAL APPLICATIONS (Apartments, Rental Properties, etc.)
The warranty period is five (5) years on parts. The warranty is to the original owner only and is not transferable.

OTHER APPLICATIONS
The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is to the original owner only and is not transferable.

LEGAL REMEDIES: The owner **must** notify the Company in writing, by certified or registered letter to CAC/BDP, Warranty Claims, P.O. Box 4808, Syracuse, New York 13221, of any defect or complaint with the product, stating the defect or complaint and a specific request for repair, replacement, or other correction of the product under warranty, mailed at least thirty (30) days before pursuing any legal rights or remedies.

Always Ask For
FACTORY AUTHORIZED PARTS

WARRANTY CONDITIONS:

1. To obtain the longer warranty periods as shown in the table under original owner, for the original purchaser, the product must be properly registered at *www.cac-bdp.com* within ninety (90) days of original installation. In jurisdictions where warranty terms conditioned on registration are prohibited by law, registration is not required and the longer warranty period shown will apply.
2. Where a product is installed in a newly constructed home, the date of installation is the date the homeowner purchased the home from the builder.
3. If the date of original installation cannot be verified, then the warranty period begins ninety (90) days from the date of product manufacture (as indicated by the model and serial number). Proof of purchase may be required at time of service.
4. The remainder of the first five years of warranty is freely transferable without registration.
5. Product must be installed properly and by a licensed HVAC technician.
6. The warranty applies only to products remaining in their original installation location.
7. Installation, use, care, and maintenance must be normal and in accordance with instructions contained in the Installation Instructions, Owner's Manual and Company's service information.
8. Defective parts must be returned to the distributor through a registered servicing dealer for credit.

LIMITATIONS OF WARRANTIES: ALL IMPLIED WARRANTIES AND/OR CONDITIONS (INCLUDING IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE OR PURPOSE) ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY. SOME STATES OR PROVINCES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY OR CONDITION LASTS, SO THE ABOVE MAY NOT APPLY TO YOU. THE EXPRESS WARRANTIES MADE IN THIS WARRANTY ARE EXCLUSIVE AND MAY NOT BE ALTERED, ENLARGED, OR CHANGED BY ANY DISTRIBUTOR, DEALER, OR OTHER PERSON, WHATSOEVER.

THIS WARRANTY DOES NOT COVER:

1. Labor or other costs incurred for diagnosing, repairing, removing, installing, shipping, servicing or handling of either defective parts, or replacement parts, or new units.
2. Any product purchased over the Internet.
3. Normal maintenance as outlined in the installation and servicing instructions or Owner's Manual, including filter cleaning and/or replacement and lubrication.
4. Failure, damage or repairs due to faulty installation, misapplication, abuse, improper servicing, unauthorized alteration or improper operation.
5. Failure to start due to voltage conditions, blown fuses, open circuit breakers, or damages due to the inadequacy or interruption of electrical service.
6. Failure or damage due to floods, winds, fires, lightning, accidents, corrosive environments (rust, etc) or other conditions beyond the control of Company.
7. Parts not supplied or designated by Company, or damages resulting from their use.
8. Products installed outside the U.S.A. or its territories and Canada.
9. Electricity or fuel costs, or increases in electricity or fuel costs from any reason whatsoever, including additional or unusual use of supplemental electric heat.
10. Any cost to replace, refill or dispose of refrigerant, including the cost of refrigerant.
11. **ANY SPECIAL, INDIRECT OR CONSEQUENTIAL PROPERTY OR COMMERCIAL DAMAGE OF ANY NATURE WHATSOEVER.** Some states or provinces do not allow the exclusion of incidental or consequential damages, so the above limitation may not apply to you.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province.

Always Ask For
FACTORY AUTHORIZED PARTS